

Application No. 10/761,004

Attorney Docket No. 2003-0484 / 24061.523
Customer No. 42717

REMARKS

Claims 1-25 are pending in this application. Claims 1, 11, 19, and 20 are amended. No new matter is added as a result of the above amendments.

Reconsideration of this application in light of the above amendments and the following remarks is requested.

35 U.S.C. §103(a), Alleged Obviousness, Claims 1, 2, and 9

Claim 1

Claims 1, 2, and 9 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No. 6,705,925 to Cole et al. ("Cole"). Applicant traverses this rejection on the grounds that these references are defective in establishing a prima facie case of obviousness with respect to claim 1.

Amended independent claim 1, recites as follows:

1. A method to singulate a circuit die from an integrated circuit wafer, said method comprising:
providing an integrated circuit wafer containing a circuit die;
cutting through said integrated circuit wafer by performing a single, continuous cut around more than one side of the perimeter of said circuit die at a time to thereby singulate said circuit die. (Emphasis added).

As the PTO recognizes in MPEP § 2142:

... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...

It is submitted that, in the present case, the examiner has not factually supported a prima facie case of obviousness for the following, mutually exclusive, reasons.

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1. Cole Does Not Teach or Suggest the Claimed Subject Matter

Cole cannot be applied to reject claims 1, 2, and 9 under 35 U.S.C. § 103 which provides that:

A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ... (Emphasis added)

Thus, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. Cole neither teaches nor suggests cutting through said integrated circuit wafer by performing a single, continuous cut around more than one side of the perimeter of said circuit die at a time to thereby singulate said circuit die. Figure 2 of Cole is shown below:

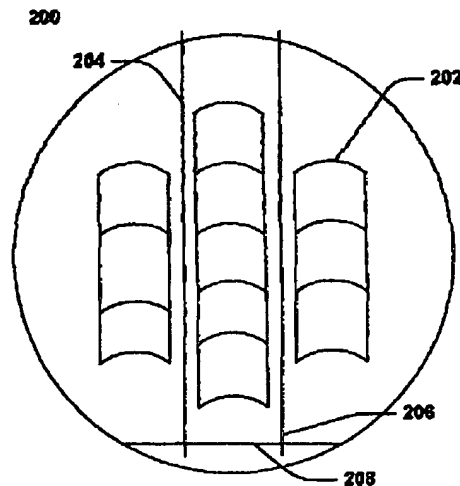


FIG. 2

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As shown in Figure 2 and at column 4, lines 48-64, Cole teaches making three cuts on the wafer: vertical cuts 204 and 206 in parallel and horizontal cut 208 perpendicular to cuts 204 and 206. While Cole teaches, in Figures 7 and 8, a jet fluid cutting system that cuts the dice from the wafer, Cole does not teach cutting more than one side of the perimeter of the circuit die at a time. To the contrary, Cole teaches a cutting method that is similar to the prior art as described on page 4 of the current specification, in which the wafer is cut in a series of horizontal passes and vertical passes. Cole does not teach a single, continuous cut around more than one side of the perimeter of said circuit die at a time to thereby singulate said circuit die. Even though Cole teaches cutting a curvilinear side of the perimeter, the curvilinear side of the perimeter is only one side of the perimeter. Nowhere in the reference does Cole teach or suggest cutting around both the curvilinear side and the horizontal or vertical side of the perimeter at a time. Therefore, Cole fails to teach or suggest the features of claim 1.

In addition, while the examiner admits that Cole fails to disclose a single, continuous cut, the examiner alleges that it would have been obvious to one of ordinary skill in the art to perform the curvilinear cutting in Cole in a single, continuous cut because it would be impractical to cut a curvilinear shape by feeding the computer a new set of coordinates data for every indefinite straight lines cut that approximate the curve. Applicants respectfully disagree. There is no teaching or suggestion in Cole to cut more than one side of the perimeter. To the contrary, Cole teaches a jet fluid cutting system that cuts only one side of the perimeter at a time. Furthermore, even, *arguendo*, if Cole teaches performing a single, continuous cut, Cole still does not teach or suggest performing a single, continuous cut around more than one side of the perimeter of the die at a time. Cole merely teaches cutting around only one side, either vertical, horizontal, or curvilinear side of the perimeter at a time. Therefore, it would not have been obvious for a person of ordinary skill to modify Cole's teaching to reach the presently claimed invention.

Thus, it is impossible to render the subject matter of claim 1 as a whole obvious, and the explicit terms of the statute cannot be met. Thus, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been

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met, and the rejection of claim 1, under 35 U.S.C. §103(a) should be withdrawn. By virtue of their dependency on claim 1, Cole also fails to teach or suggest the features of claims 2 and 9. In view of the above, the rejection of claims 2 and 9 under 35 U.S.C. §103(a) should also be withdrawn.

Claim 10, 11, 18, and 20

Claims 10, 11, 18, and 20 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No. 6,705,925 to Cole et al. ("Cole") in view of the alleged Applicant Admitted Prior Art ("AAPA"). Applicants traverse this rejection on the grounds that these references are defective in establishing a prima facie case of obviousness with respect to claims 10, 11, 18, and 20.

Amended independent claim 11, recites as follows:

11. A method to singulate a circuit die from an integrated circuit wafer, said method comprising:
providing an integrated circuit wafer by performing a single, continuous cut around more than one side of the perimeter of said circuit die at a time to thereby singulate said circuit die and wherein said singulated circuit die comprises a non-rectangular perimeter;
fixably mounting said singulated circuit die to a package; and
coupling signal pins of said package to signals in said electronic circuit.
(Emphasis added).

As the PTO recognizes in MPEP § 2142:

... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...

It is submitted that, in the present case, the examiner has not factually supported a prima facie case of obviousness for the following, mutually exclusive, reasons.

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1. Neither Cole nor the alleged AAPA Teaches or Suggests the Claimed Subject Matter

Cole and the alleged AAPA cannot be applied to reject claims 10, 11, 18, and 20 under 35 U.S.C. § 103(a) which provides that:

A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ... (Emphasis added)

Therefore, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. Neither Cole nor the alleged AAPA teaches or suggests performing a single, continuous cut around more than one side of the perimeter of said circuit die at a time to thereby singulate said circuit die and wherein said singulated circuit die comprises a non-rectangular perimeter. As discussed above in arguments presented for claim 1, Cole fails to teach or suggest these features. The alleged AAPA also fails to teach or suggest such features. Based on Figure 3 of the current specification, where a prior art circuit wafer is shown, the wafer is not provided by performing a single, continuous cut around more than one side of the perimeter of the circuit die at a time. To the contrary, a diamond blade saw is used to cut through the wafer in a vertical direction followed by another cut in the horizontal direction. Thus, similar to Cole, the alleged AAPA cuts around only one side of the circuit die at a time. Therefore, neither Cole nor the alleged AAPA teaches or suggests the features as recited in claim 11 of the present invention. Amended independent claim 20 recites similar subject matter also not taught or suggested by either Cole or the alleged AAPA. Accordingly, Applicants respectfully request the withdrawal of the rejection to claims 11 and 20 of the present invention.

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2. The Combination of References is Improper

Assuming, *arguendo*, that none of the above arguments for non-obviousness apply (which is clearly not the case based on the above), there is still another, mutually exclusive, and compelling reason why Cole and the alleged AAPA cannot be applied to reject claims 11 and 20 under 35 U.S.C. § 103(a).

§ 2142 of the MPEP also provides:

...the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made..... The examiner must put aside knowledge of the applicant's disclosure, refrain from using hindsight, and consider the subject matter claimed 'as a whole'.

Here, neither Cole nor the alleged AAPA teaches, or even suggests, the desirability of the combination since neither teaches performing a single, continuous cut around more than one side of the perimeter of said circuit die at a time as specified above and as claimed in claims 11 and 20 of the present invention.

Thus, it is clear that neither Cole nor the alleged AAPA provides any incentive or motivation supporting the desirability of the combination. Therefore, there is simply no basis in the art for combining the references to support a 35 U.S.C. § 103(a) rejection.

In this context, the MPEP further provides at § 2143.01:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

In the above context, the courts have repeatedly held that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.

In the present case it is clear that the examiner's combination arises solely from hindsight based on the invention without any showing, suggestion, incentive or motivation in either reference for the combination as applied to claims 11 and 20. Therefore, for this mutually

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exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

Claims 3-7, 12-16, and 21-25

Claims 3-7, 12-16, and 21-25 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No. 6,705,925 to Cole et al. ("Cole") in view of U.S. Patent No. 6,713,843 to Fu ("Fu"). Applicants traverse this rejection on the grounds that these references are defective in establishing a *prima facie* case of obviousness with respect to claims 3-7, 12-16, and 21-25.

As the PTO recognizes in MPEP § 2142:

... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...

It is submitted that, in the present case, the examiner has not factually supported a *prima facie* case of obviousness for the following, mutually exclusive, reasons.

1. Neither Cole nor Fu Teaches or Suggests the Claimed Subject Matter

Cole and Fu cannot be applied to reject claims 3-7, 12-16, and 21-25 under 35 U.S.C. § 103(a) which provides that:

A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ... (Emphasis added)

Therefore, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. Neither Cole nor Fu teaches or suggests the features of claims 1 and

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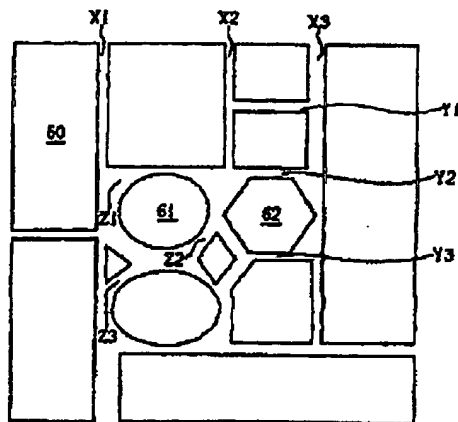
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11, from which claims 3-7, 12-16, and 21-25 depend, which recites performing a single, continuous cut around more than one side of the perimeter of said circuit die at a time to thereby singulate said circuit die. As discussed above in arguments presented for claims 1 and 11, Cole fails to teach or suggest these features. Fu also fails to teach or suggest such feature. Fu solves the problem of uneven scribe line widths in a probe test by setting a proper stepping distance for each step (column 2, lines 59-64). However, Fu does not teach a cutting method that performs a single continuous cut around more than one side of the perimeter of a circuit die at a time.

Figure 5 of Fu is shown below:



As shown in Figure 5, Fu teaches a wafer that includes a plurality of dies in different shapes and sizes, such as a rectangular die 60, a circular die 61, and a hexagonal die 62. A plurality of scribe lines are arranged in different directions. For example, scribe lines X1, X2, and X3 are arranged in a vertical direction, the scribe lines Y1, Y2, and Y3 are arranged in a horizontal direction, and scribe lines Z1, Z2, and Z3 are arranged in diagonal direction (column 4, lines 17-30). Thus, using Fu's scribe lines, the circuit die is cut in one direction only, either vertical, horizontal, or diagonal. Nowhere in the reference does Fu teach or suggest that

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more than one direction or side of the perimeter of the circuit die is cut at one time. Therefore, Fu also fails to teach or suggest the features of claims 1 and 11, from which claims 3-7, 12-16, and 21-25 depend.

Therefore, neither Cole nor Fu teaches or suggests the features as recited in claims 1 and 11 of the present invention, from which claims 3-7, 12-16, and 21-25 depend. Accordingly, Applicants respectfully request the withdrawal of the rejection to claims 3-7, 12-16, and 21-25 of the present invention under 35 U.S.C. § 103(a).

2. The Combination of References is Improper

Assuming, *arguendo*, that none of the above arguments for non-obviousness apply (which is clearly not the case based on the above), there is still another, mutually exclusive, and compelling reason why Cole and the Fu cannot be applied to reject claims 3-7, 12-16, and 21-25 under 35 U.S.C. § 103(a).

§ 2142 of the MPEP also provides:

...the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made.....The examiner must put aside knowledge of the applicant's disclosure, refrain from using hindsight, and consider the subject matter claimed 'as a whole'.

Here, neither Cole nor Fu teaches, or even suggests, the desirability of the combination since neither teaches performing a single, continuous cut around more than one side of the perimeter of said circuit die at a time as specified above and as claimed in claims 1 and 11 of the present invention, from claims 3-7, 12-16, and 21-25 depend.

Thus, it is clear that neither Cole nor Fu provides any incentive or motivation supporting the desirability of the combination. Therefore, there is simply no basis in the art for combining the references to support a 35 U.S.C. § 103(a) rejection.

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In this context, the MPEP further provides at § 2143.01:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

In the above context, the courts have repeatedly held that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.

The examiner alleges that it would have been obvious for a person of ordinary skill in the art at the time the invention was made to modify Cole's teaching by fabricating the non-rectangular, irregular shaped dice having the shapes as suggested by Fu because dice having such shapes would have the benefit of increasing wafer area. Applicants respectfully disagree. There is no teaching or suggestion in either Cole or Fu of cutting around more than one side of the perimeter of the circuit die at a time. Cole merely teaches cutting horizontally, vertically, or along the curvilinear side of the perimeter at a time. Fu merely teaches scribe lines that are arranged either vertically, horizontally, or diagonally. Thus, even with Fu's teaching of non-rectangular, irregular shaped dice, a person of ordinary skill in the art would not have been led to cut around more than one side of the perimeter of the circuit die at a time, because neither Cole nor Fu teaches or suggests such features.

Furthermore, even, *arguendo*, if a person were to combine the teachings of Cole and Fu, the resulting combination would not be performing a single continuous cut around more than one side of the perimeter of a circuit die at a time. Rather, the resulting combination would be performing a single vertical, horizontal, curvilinear, or diagonal cut around one side of the perimeter of a circuit die at one time. Therefore, it is clear that the examiner's combination arises solely from hindsight based on the invention without any showing, suggestion, incentive or motivation in either reference for the combination as applied to claims 1 and 11, from which claims 3-7, 12-16, and 21-25 depend. Therefore, for this mutually exclusive reason, the

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examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

Claims 8 and 17

Claims 8 and 17 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No. 6,705,925 to Cole et al. ("Cole") in view of U.S. Publication No. 2004/0259291 to Takiar ("Takiar"). Applicants traverse this rejection on the grounds that these references are defective in establishing a *prima facie* case of obviousness with respect to claims 8 and 17.

As the PTO recognizes in MPEP § 2142:

... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...

It is submitted that, in the present case, the examiner has not factually supported a *prima facie* case of obviousness for the following, mutually exclusive, reasons.

1. Neither Cole nor Takiar Teaches or Suggests the Claimed Subject Matter

Cole and Takiar cannot be applied to reject claims 8 and 17 under 35 U.S.C. § 103(a) which provides that:

A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ... (Emphasis added)

Therefore, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. Neither Cole nor Takiar teaches or suggests the features of claims 1 and 11, from which claims 8 and 17 depend, which recites performing a single, continuous cut around more than one side of the perimeter of said circuit die at a time to thereby singulate said

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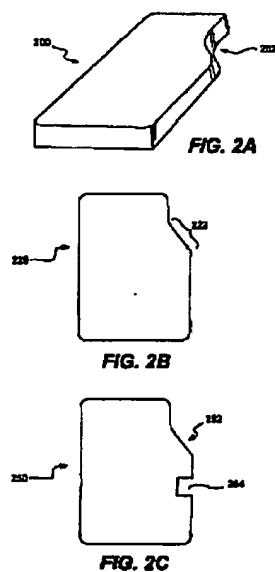
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circuit die. As discussed above in arguments presented for claims 1 and 11, Cole fails to teach or suggest these features. Takiar also fails to teach or suggest such features. Takiar teaches a singulation of a batch into individualized integrated circuit products using a non-linear sawing or cutting action so that the resulting individualized integrated circuit packages no longer need to be completely rectangular. However, Takiar does not teach a cutting method that performs a single continuous cut around more than one side of the perimeter of a circuit die at a time. Figures 2A-2C of Takiar are shown below:



As shown in Figures 2A-2C, Takiar teaches sawing action that uses a combination of linear cutting and non-linear cutting (paragraph 32). In addition, Takiar teaches a sawing action that is able to produce integrated circuit products that have curved portions or small features in their external body or form factor. The resulting integrated circuit products are non-rectangular due to at least one portion being curve, multi-faceted, or otherwise non-rectangular. Thus, Takiar

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teaches a cutting method similar to Cole and Fu in that Takiar also teaches performing a cut along only one side of the perimeter of the circuit. This is based on Takiar's teaching of a sawing action that cuts only a portion of the perimeter being curved. Nowhere in the reference does Takiar teach or suggest cutting more than one side of the perimeter of the circuit die at a time. In fact, none of the integrated circuit products as shown in Figures 2A-2C shows a curve or notch on more than one side of the perimeter, because Takiar's sawing action only enables cutting of one side of the perimeter, not more than one side of the perimeter. Therefore, Takiar also fails to teach or suggest the features of claims 1 and 11, from which claims 8 and 17 depend. Accordingly, Applicants respectfully request the withdrawal of the rejection to claims 8 and 17 of the present invention under 35 U.S.C. § 103(a).

2. The Combination of References is Improper

Assuming, *arguendo*, that none of the above arguments for non-obviousness apply (which is clearly not the case based on the above), there is still another, mutually exclusive, and compelling reason why Cole and Takiar cannot be applied to reject claims 8 and 17 under 35 U.S.C. § 103(a).

§ 2142 of the MPEP also provides:

...the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made.....The examiner must put aside knowledge of the applicant's disclosure, refrain from using hindsight, and consider the subject matter claimed 'as a whole'.

Here, neither Cole nor Takiar teaches, or even suggests, the desirability of the combination since neither teaches performing a single, continuous cut around more than one side of the perimeter of said circuit die at a time as specified above and as claimed in claims 1 and 11 of the present invention, from claims 8 and 17 depend.

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Thus, it is clear that neither Cole nor Takiar provides any incentive or motivation supporting the desirability of the combination. Therefore, there is simply no basis in the art for combining the references to support a 35 U.S.C. § 103(a) rejection.

In this context, the MPEP further provides at § 2143.01:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

In the above context, the courts have repeatedly held that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.

The examiner alleges that it would have been obvious for a person of ordinary skill in the art at the time the invention was made to modify Cole's teaching by employing a laser to singulate non-rectangular die as suggested by Takiar, because the substitution of the art recognized alternatives to make the same would have been within the level of ordinary skill in the art, absent a showing of criticality or unexpected result by the Applicants. Applicants respectfully disagree. There is no teaching or suggestion in either Cole or Takiar of cutting around more than one side of the perimeter of the circuit die at a time. Cole merely teaches cutting horizontally, vertically, or along the curvilinear side of the perimeter at a time. Takiar merely teaches cutting along a curved portion of the integrated circuit product. Thus, even with Takiar's teaching of a sawing action that cuts around a curved portion of the integrated circuit product, a person of ordinary skill in the art would not have been led to cut around more than one side of the perimeter of the circuit die at a time, because neither Cole nor Takiar teaches or suggests such features.

Furthermore, even, *arguendo*, if a person were to combine the teachings of Cole and Takiar, the resulting combination would not be performing a single continuous cut around more than one side of the perimeter of a circuit die at a time. Rather, the resulting combination would be performing a single vertical, horizontal, curvilinear, or curved cut around a portion of the

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perimeter of a circuit die at a time. Therefore, it is clear that the examiner's combination arises solely from hindsight based on the invention without any showing, suggestion, incentive or motivation in either reference for the combination as applied to claims 1 and 11, from which claims 8 and 17 depend. Therefore, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

Claim 19

Amended independent claim 19, recites as follows:

19 A method to singulate a circuit die from an integrated circuit wafer, said method comprising:
 providing an integrated circuit wafer containing a circuit die;
providing a first cut partially cutting said integrated circuit wafer using a focused beam apparatus;
providing a second cut cutting through said integrated circuit wafer using a wafer saw blade apparatus;
wherein at least one of the first and second cut is performed by a single continuous cut around more than one side of the perimeter of said circuit die at a time. (Emphasis added).

While the examiner fails to address in the office action the features of claim 19, Applicants respectfully submit that Cole, Fu, and Takiar, either alone or in combination, fail to teach or suggest the features emphasized above. As discussed above in arguments presented for claims 1 and 11, neither Cole nor Fu teaches or suggests the features of performing a single continuous cut around more than one side of the perimeter of the circuit die at a time, because Cole merely teaches performing a prior art method of cutting a die along only one side of the perimeter. Similarly, Fu merely teaches cutting a die vertically, horizontally, or diagonal. In addition, in arguments presented for claims 20 above, Takiar also fails to teach or suggest such features, because Takiar merely teaches a sawing action that only cuts a curved portion of the integrated circuit product instead of more than one side of the perimeter. Therefore, Cole, Fu,

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and Takiar, either alone or in combination, fail to teach or suggest the feature of wherein at least one of the first and second cut is performed by a single continuous cut around more than one side of the perimeter of said circuit die at a time, as recited in claims 19 of the present invention.

In addition, Cole, Fu, and Takiar, either alone or in combination, fail to teach or suggest providing a first cut partially cutting said integrated circuit wafer using a focused beam apparatus and providing a second cut cutting through said integrated circuit wafer using a wafer saw blade apparatus. None of the references provides a first cut using a focused beam and a second cut using a saw blade to cut the same integrated circuit wafer at a time. Cole merely teaches a two step process in Figure 7, which includes a first cutting step of a wafer in a cutting machine to form a wafer segment, then removing the wafer from the cutting machine and placing it in the jet fluid cutting system which performs the second cut. Fu, on the other hand, only teaches scribe lines that are arranged either vertically, horizontally, diagonally, such that cutting may be performed along either vertical, horizontal, or diagonal side of the perimeter. Fu fails to mention cutting a circuit using both a focused beam and a saw blade. Takiar teaches a sawing action that cuts a curved portion of the integrated circuit product, but fails to mention any cutting by a focused beam. Therefore, None of the references above, either alone or in combination, teaches or suggests the specific features of claim 19 of the present invention. Accordingly, Applicants respectfully request the withdrawal of the rejection to 19 under 35 U.S.C. § 103(a).

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Conclusion

It is clear from all of the foregoing that independent claims 1, 11, 19 and 20 are in condition for allowance. Dependent claims 2-9, 12-18, and 21-25 depend from, and further limit, independent claims 1, 11, and 20 and therefore are allowable as well.

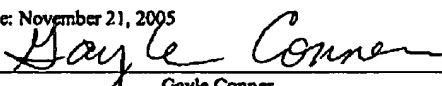
The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

Respectfully submitted,



Wing Y. Mok
Agent for Applicants
Registration No. 56,237

Dated: November 21, 2005
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